BALLY MANUFACTURING CORPORATION, a Delaware corporation,

Plaintiff/Counterdefendant,

vs.

D. GOTTLIEB & CO., a corporation, WILLIAMS ELECTRONICS, INC., a corporation, and ROCKWELL INTERNATIONAL CORPORATION,

Defendants/Counterplaintiffs.

Docket No. 78 C 2246

Chicago, Illinois
January 11, 1984
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VOLUME VII-A
TRANSCRIPT OF PROCEEDINGS
BEFORE THE HONORABLE JOHN F. GRADY

TRANSCRIPT ORDERED BY: MR. JEROLD B. SCHNAYER
MR. MELVIN M. GOLDENBERG

APPEARANCES:

For the Plaintiff/
Counterdefendant:

MR. KATZ
MR. SCHNAYER
MR. TONE
MS. SIGEL

For the Defendants/
Counterplaintiffs:

MR. LYNCH
MR. HARDING
MR. GOLDENBERG
MR. ELLIOTT
MR. RIFKIN
MR. GOTTLIEB
MR. ARVEY

Court Reporter:

LAURA M. BRENNAN
219 South Dearborn Street, Room 1918
Chicago, Illinois 60604

THE COURT: Good morning, counsel.

MR. LYNCH: Good morning, your Honor.

MR. SCHNAYER: Good morning, your Honor.

THE CLERK: 78 C 2246, Bally Manufacturing v. Gottlieb, case on trial.

MR. SCHNAYER: We call the witness again, Dr. James Schoeffler.

JAMES SCHOEFFLER, PLAINTIFF'S WITNESS, PREVIOUSLY SWORN.

MR. LYNCH: May it please the Court, your Honor --

THE WITNESS: Good morning, your Honor.

MR. LYNCH: -- Dr. Schoeffler yesterday, when he indicated what he had read in preparation for his testimony, particularly on this issue of infringement, indicated that he had read the patent and claims and reviewed the structures of the defendants. However, there was no indication that Dr. Schoeffler had read the file history of the patent in suit.

Now, there are numerous cases -- and I am sure the Court is aware of them -- that that is necessary to construe the patent and to consider the issue --

THE COURT: I am not aware of the cases, no.

MR. LYNCH: Pardon?

THE COURT: I said I am not aware of the cases. You are kind to say that I am, but I am not.

MR. LYNCH: I show your Honor at 215 U.S.P.Q. 629

at 640 a Southern District of Indiana case, summarizing the law in this circuit.

The law in this jurisdiction and the mandate of the Supreme Court is that the file history of the patent must be considered in addition to the patent itself in construing the claims.

718 F. 2d 365, at 376, the case of SSIH v. The International Trade Commission -- well, it is the Court of Appeals for the Federal Circuit, indicating with respect to infringement the question of law, "What is the thing patented" is one of law.

Down below, "From a review of the entire record, we find that the conclusion arrived at by the Commission is unsupported by substantial evidence. Not only has the Commission erroneously ignored the prosecution history of Claim 12, which is always relevant to the proper interpretation of a claim."

There are similar authorities here. I am prepared to cite the Court specifically the Seventh Circuit Super Products Corporation --

THE COURT: Do you have a case that says a witness cannot testify unless he has read the file history?

MR. LYNCH: Well, if he's going to be testifying about infringement and giving the Court evidence, I don't mind if he undertakes to do so over the break, your Honor. But the idea is, is if he is going to talk about infringement, we are hamstrung on cross examination if the gentleman hasn't read the file history.

THE COURT: It seems to me, on the contrary, he's hamstrung. If the file history bears upon the scope of the claims and he's unfamiliar with that history, it seems to me the problem is his, not yours.

MR. LYNCH: It seems to me, your Honor, that in order for the witness to properly give testimony on the issue of infringement he has to have indicated --

THE COURT: If you had a case that squarely held that this goes to the competency of the witness on the subject of infringement, I'd like to have it. Short of that, I'm going to let him testify.

MR.KATZ: Thank you.

MR. SCHNAYER: Thank you, your Honor.

THE COURT: Proceed, Mr. Schnayer.

MR. SCHNAYER: Your Honor, just to state where we are at this point: We're going to be having the witness testify about the meaning of the various claims that I indicated yesterday, 45, 46, 47, 48, 49, and 95.

He will then, for commercial success purposes,

read the various claims on the Midway Fireball pinball machine and the Bally Freedom pinball machine, and then he will be reading the claims on representative games for Gottlieb and Williams.

And we have stipulations, as I indicated yesterday, concerning those various games.

THE COURT: All right.

MR. LYNCH: May it please the Court, your Honor.

THE COURT: Yes.

MR. LYNCH: There is one other case, the case of Super Products Corporation v. D. P. Way Corporation, Seventh Circuit, 546 F. 2d 748 and 756. In that case:

"The defendant asserted that summary judgment was improper, arguing that it should have been permitted to introduce expert testimony to show the combination of elements making up its vacuum cleaner achieve the patentable result. This proposed testimony is an invitation of the Court to consider which set of elements, the vacuum cleaner or the filtration device, should have been patented, and it has no proper bearing on the question of which was patented. The identity of a patented invention as well as it scope is determined by the claim or claims submitted by the Patent Office -- by the applicant and allowed by the Patent Office."

It goes on to say that the file history must be considered in that situation.

It does not specifically address the exclusion of testimony, but I did want to put it on the record, your Honor.

THE COURT: All right.

DIRECT EXAMINATION (Continued)

BY MR. SCHNAYER:

Q. Dr. Schoeffler, starting with claim 45, on an element-by-element basis, would you please state how you determine the meaning of each element in Claim 45 of the patent.

A. Yes, I will.

Q. And let me, just for the Court's information -- I believe we have point 45 blown up as PX-4004-A and PX-4004-B.

MR. GOLDENBERG: Excuse me, Mr. Schnayer. Until these charts are actually used, can they be removed down? They're blocking our view.

MR. SCHNAYER: He's going to be using all the charts as he refers, that's the problem.

THE COURT: We can move them all the way around here to this wall, if you like.

MR. KATZ: That would be good.

THE COURT: Just move your arc to the left.

MS. SIGEL: Your Honor, here's a written copy of that claim.

THE COURT: Thank you.

(Brief interruption.)

BY THE WITNESS:

A. Claim 45 preamble calls for a pinball game.

And in Figure 1 and Figure 3 of the patent a pinball game is displayed, with the usual components of the pinball game that are also described in columns 2 and 5 of the patent, namely, solenoid activated elements, flippers, targets, lamps, digits and display and the like.

In (a) the claim calls for -- the element is a processor having programming means and memory means.

And I'll use the schematic diagram in Figure 5, Exhibit 412-C, to describe that.

This is a diagram that shows the microcomputer, and schematically approximately the circuitry required to connect it to the pinball machine itself.

BY MR. SCHNAYER:

Q. Could you indicate what number that is for the record, please?

A. Yes. It is Exhibit 412-C, Figure 5 from the patent.

Q. And as you refer to the elements, for the record, please indicate which elements you're referring to so it will be clear. Thank you.

A. The processor we use synonymously with the word micro-computer that we have been talking about thus far.

And this is the portion of the system that consists of the central processor unit, shown in the block diagram labeled No. 51 on the diagram, and the memory units to go with it, namely the read only memory, element 53; the random access memory, elemnt 52; and the input/output ports or chips that are associated with the processor, that are shown here in element 57;

Along with a special input port labeled "interrupt," No. 65, shown at the top of the diagram right here;

Along with the wires for address control and data passing back and forth that we have mentioned in the past.

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So the processor or microcomputer in Figure 5 consists of these elements shown here that I just listed by number having program means and memory means.

By memory means, we mean a device where we can use it as a scratch pad memory to hold, for example, the current status of the switches and the lights. So this is where data elements are stored.

This is the random access memory block shown right here, element No. 52.

Programming means is the area in which the program is stored. This is element No. 53, the read only memory, and where the memory is stored in this dedicated microcomputer device; read only because it does not disappear when we turn off the power, and the program will still be there when we get back, along with the program itself, which implements all of the real time control sequencing/inputting of data from the pinball machine, outputting of data to the pinball machine, et cetera, in the program, and implementing the noise immunity considerations that we have mentioned; in particular, that when it receives a signal from the switches that it reads the signal twice to insure that there is not noise present on the signal, that it debounces the signal, so that if the switch is not firmly closed, that an erroneous switch closure is not detected, that it handles the error recovery aspects of the real time, so that if a

switch is stuck, for example, that the machine does not stop and will continue.

So handling of stuck switches is the function of the program.

Then, finally, the sequencing of all the functions according to the game rules, so that in a noisy environment, the switches can be read reliably, the lamps can be lit reliably, and the digits can be written reliably, and fast enough to give real time response.

Hardware noise prevention associated with this microcomputer is also shown in the figure and mentioned throughout the patents. We listed them in the noise and real time aspects yesterday, and specifically that the separation between the microcomputer board itself where the logic is and the driver is maintained, as shown in Figure 3, element 23, and shown coupled with element 22 in Figure 2, and the separation of the boards, the electronic boards, from the playfield where the noise components exist, as shown in Figure 3 of the patent.

Continuing with Item B, a ball is actually shown in Figure 1 on the figure-- on the diagram for the pinball machine, element 12, and described in the patent in column 1; a downwardly inclined playing field in Section C, is also diagrammed in the Figure 1 and described in the patent in column 1.

Item D, player operated means for ejecting the ball onto the playing field whereby the ball may roll downwardly, this is the ball ejection mechanism which is -- I believe it is element 15 on the diagram, Figure 1 of the patent described in column 1 of the patent.

Item D -- I am sorry -- Item E, a plurality of response means for detecting the ball. The response means that are disclosed in the patent are all of the targets, the holes where the ball falls in, the slingshots, et cetera, all of the elements that the ball can hit and where, according to the game rules, a lamp may be lit, a score may be accumulated, or a solenoid activated to cause the ball to jump away.

"...and having signaling means associated therewith..."

The signaling means associated with the response means are disclosed as the switches, which close when the ball hits the target, and those are the switches which the microcomputer must read and scan in order to determine that a target of any kind has been hit.

The switches are indicated on the diagram Figure 4, Exhibit 412-C, in this portion of the diagram right about here (indicating), and I will attempt to show the switches here and the way they are interconnected in the schematic that appears in the patent.

The symbol for the switch is simply a straight line that is at an angle to another wire with a black dot at the end, which is used to indicate that the switch is open because it is separated on the diagram from the black dot, and that if the switch were to swing to the right and be connected to the dot, the switch would close and hence indicating that when the switch closes, the path is completed from the one point to the next point.

Now if we examine the switches here, we can see by tracing the paths the way the switches are connected into the system, and in particular if we follow the switch that has no number but is analogous to the switches that are numbered 97 on the figure, we notice that the series of

switches are all connected together on the line where the switches are labeled 47 and coming into the area that is labeled 44 on the diagram.

So one side of the switches is connected together, and we will say that these switches are hence connected in a row in a matrix.

When I think of a matrix as a connection of elements, I can actually think of wires corresponding to the rows and the columns, and when I say an element is connected from a column to a row, I mean literally one end of the element is physically connected to a column wire and the other end of the element is physically connected to the row wire. So you can always tell if elements are in a row because you can trace a wire and see that one end of them are physically connected together.

So these switches, one end is physically connected together by these wires, and we notice in the vicinity of the switches 97 that the patent shows four rows of this matrix with the switches connected together. The other ends of the switches up around 97 are shown connected to diodes, which then proceed up the columns of the matrix, up to the element 61, which is called the decoder, which I will mention in a little bit.

The implication here is that if we follow any one column of switches, there are four rows in the matrix,

and we see that these switches, the other ends of them are also connected together and up to the top of the matrix.

Now what actually is described in detail in the patent and is required is that there is a diode associated with each switch in the matrix normally so that sneak paths through the circuit that could give false switch readings are not present.

For clarity on the diagram, only the one diode happens to be shown here, but if we think of each switch as being associated with a diode, then one end of the switch is connected to the row and the other to the column, and these columns go up to where they are used for scanning purposes and we see the columns of the switches coming up here.

Only a portion of the schematic is actually shown for clarity in Figure 5. There are actually 16 columns in this matrix.

THE COURT: Tell me again what a diode does.

THE WITNESS: All right, a diode is an electronic device that permits current to go in only one direction, and the reason it is important in a switch matrix is that in order to detect that a switch is closed, we are going to send current through it to produce a voltage that the microcomputer can observe because the microcomputer itself cannot observe the physical position of a switch. It has to be changed to an electrical signal.

THE COURT: Thank you.

BY THE WITNESS:

A. Now, the reason they are important in the circuit is that the way we are going to send this current through is in the direction from left to right in Figure 5 and then to the diode -- the symbol of the diode has an arrow which indicates the direction that current is flowing -- up to this point, and if that were not there, then sometimes current might flow in the opposite direction, and it is possible for the microcomputer when it reads the switch settings to actually think a switch is closed when it is another switch.

So this is a means of avoiding errors in the reading of the switches, and the reading of the switches is, of course, one of the dominant and most important functions in carrying out the real time pinball game application.

So we have mentioned in discussing the response means and the means for signaling that the ball

has hit the response means, the switches.

Now, associated with the switches themselves, of course, are necessary electronics outside the microcomputer that is required to drive that and make it work properly. So your microcomputer is up here (indicating), and the remaining electronics associated with the switches would consist of, for example, the voltage source that we use to drive current through the switches so that the microcomputer sees an electrical signal instead of a mechanical signal, some resistors that are shown connected to the rows of the switch matrix, which are present there so that the voltage signals are the correct level that the microcomputer accepts, and finally a location where the values of the switches can be read into, and on the diagram this is called register 60.

I should have mentioned that the voltage source for the switches is labeled 68, I believe that number is, and the resistors themselves are labeled 96 on the diagram.

BY MR. SCHNAYER:

Q. Could you explain what you mean by a voltage source, 68?

A. Present on the electronic boards associated with the microcomputer and the driver boards in the back is a location where voltage exists in the machine, which is equivalent

to having a battery there that one can use and attach to this point and hence send current through the switches.

So it is exactly analogous to a battery, except that that voltage is derived from the power line itself and is subject, of course, to those disturbances.

Continuing with Item (e):

"...and operatively connected to the processor for signaling the processor that the response means has detected the ball."

By "operatively connected to the processor" is disclosed two things. First it must be possible for those signals to be converted to electrical signals, as we just mentioned, and read into the CPU chip of the processor so that it can store the value of that switch away in the random access memory because it has to do scoring and other calculations based on the value of that switch setting.

The operative connection to the microprocessor is shown on the diagram here as a single wire, a single connection, coming into what is called a register 60.

Now, that single wire is meant to be and is shown by the braces on the diagram in the vicinity of 96, actually the four wires with one wire corresponding to each row of the matrix.

By a register I mean nothing more than electronic memory, so that if the switch is closed, it will

put a voltage into that register that says the switch is closed, and in computer language when one talks about 0 and 1, 1 for closed and 0 for open, the data that is in that register would be a 1 if it is closed and a 0 if it is open, as an example.

So this is a memory. When I read the switches, if I look in this memory, I would see four data values, like 1, 0, 0, 1, meaning the first switch is closed, the second and third are open, and the fourth is closed.

This operative connection, as disclosed in the patent and discussed yesterday in the noise and real time response, reads in four at a time corresponding to four switches in a single column. These registers are extenal to the microcomputer.

We have been using the terminology for convenience that the microcomputer consists of the set of chips supplied by the vendor and generally intended to make up the computer portion of the system.

Now, once that data has been read into this memory or register here, it can be transferred on a path as shown here to element 57, which is an input/output unit; and from the input/output unit into the central processor unit; and the central processor unit along the line 54, 55, can send the corresponding data to a known location in the scratch memory.

In essence the computer program that is stored in element 53, the ROM, has to know where each switch setting is going to be stored in the memory. And when it reads the switch setting, it then writes it in that scratch pad in a place where it knows where it is so it can get it back at any time to do anything with it that it likes.

Q Dr. Schoeffler, it shows wires here, single wire 72, 64, 63, et cetera, in the microcomputer area.

Are those single wires actually connecting

those parts together?

A. No. The interconnections between -- especially the microcomputer chips involve many wires, because the central processor chip, when it references the memory chip, has to determine which location in memory, and so it must send address information, and that takes many wires.

Then it must send the data along those.

But for clarity, they're shown as a single connection here.

This is a rough block diagram, but with enough detail in the block diagram so that the essential features of the invention are clearly disclosed. That is, anything that affects its proper operation is clearly shown, even though the diagram is simplified.

Item (f) is concerned with a "plurality of display means for presenting information based upon the detection of the ball by the response means."

The display means are the lamps that light up in response to a target that are in both -- are shown in Figure 1 and discussed in column 1 of the patent; and they are the digits which are shown as, for example, No. 17 in Figure 1 of the patent, are used to display, for example, the score that is accumulated, because a ball has careened off a target, hit a slingshot, and had the spinner switch spin around three times, or some sequence such as that.

Now, the "display means having display activation means associated therewith."

Display activation means are any means that actually can cause the lights to light or the digits to be lighted here.

And let's look first at the digits, which are shown in Figure 5 along the bottom row, and are indicated by the elements 71, where one sees three such elements; and following the dashed line coming out of each element, a diagram showing the equivalent digital display there, displaying the scores of 0-5-8-7, 1-2-5-2, et cetera.

So these are the display means.

The display activation means consist of all the circuitry outside of the microcomputer itself, which is

required to supply the expected voltages and currents and timing signals required by any electronic device.

In the case of the digits, we have an element here on the left labeled element 69, which is called the segment drive.

And the purpose of this device is to provide certain electrical signals that are expected by the digit drivers in order for them to function correctly.

As Frederiksen described, these digits are actually displayed as sequences of straight lines, patterns of straight lines. And those are what are called segments.

And the breaks in the digits that are shown in the diagram in the vicinity of 99 are the segments.

And we see that, for example, to make up a 7, we have a horizontal segment near the top and a couple of vertical segments to the right.

These digit drives are actually expecting to light up the individual segments.

And so the display activation means must supply a signal for each segment on the light that has to be lit.

And on these, there happen to be a maximum of seven segments that can make up one of these digits. And as a consequence, this segment drive has 7 lines coming out of it, one for the first segment, second segment, up to the seventh.

And depending which ones are on, that segment will be displayed on the corresponding digits.

Q. What are those displays typically called?

A. These are called LED digital displays.

Q. Are they called 7-segment LED digital displays?

A. They are also called 7-segment LED digital displays.

Coming into the segment drive is the information coming from the computer; and in the same way this diagram abbreviated the connection to the computer for the switches, it has abbreviated the connection to the segment drive. What is coming in here is the computer's equivalent of the digit itself to be displayed. It is equivalent to an 8, and the function of this display or this display activation device is to change the computer's view of what an 8 is into a group of segments.

Q. That segment driver is --

A. No. 69.

Q. Thank you.

A. As a consequence, this is not part of the computer. It is unique to the particular devices being lit up; namely, the digit drives just as these resistors, No. 96, are unique to the fact that we are reading switches here.

Again, associated with the digit drives is a register No. 59, and the purpose of that register is to store the number of the digit that we wish to be displayed. So if we wished to display an 8, for example, an 8, the electronic equivalent of an 8 would be stored in this register, and that would look like the binary zeroes and ones if one were to look inside. This is transmitted to the segment

drive, which then arranged in a matrix sends to all those -- or to all elements in that row of the matrix the corresponding signals coming out of the segment drive.

Now, in order to determine which of the digits is lit, because you will notice that we have 12 across here, and I have only 7 lines coming in here -- there are four lines which are expanded to seven by this device, 69. I have to have a signal coming in to each of these which selects which of the six will be lit. Those correspond to the columns of the matrix.

So the same column lines that we were talking about a moment ago are also brought down after they go through the switch matrix, down, in order to select one of the columns.

So the strategy then is to select a column like column 3, put the digit to be displayed, 8, send that digit to here, and then say go, and when that happens, this sends the 8 out. This has selected the column. At the intersection of that row and column, we have an 8 display.

So we would call this a 1 -- actually, this is a 1-by-16 array of digits because in the scheme disclosed in the patent there can be up to 16 digits there. When we have 16 columns in our matrix -- so I can select any one, and I send the row out to it.

The rest of the display activation means, of course, is the electronics for selecting the column, which I will discuss in a moment.

Q. Are there any other types of display means that are disclosed?

A. Yes, there are. Of course, there are lamps on the display, and those, too, are display means that we skipped over.

Q. What number are those?

A. The lamps are in the middle section of the diagram, and that is labeled 90 on the diagram.

Again, the patent describes in detail that there can be as many as four rows of 16 of these lamps, but that is too many to display, and for clarity, only a few are displayed on the patent diagram here.

Q. That is drawn?

A. That is drawing 412-C, Exhibit PX 412-C.

If we examine -- the lamps are the display means, but the display activation means is all the circuitry that drives the lamps. Then we have circuitry in this vicinity of the lamp drive element 66 to the right, all of which is associated with driving the lamps.

Looking at element 66, this is an element with sufficient power so that we can send signals to one of the four -- to each of the four rows simultaneously analogous to reading the four rows from the switches into this register. And the value that that lamp drive actually puts out; namely, the ones and the zeroes determine

whether the lamp in that column will be on or off depending on whether it sends the equivalent of a one or a zero signal to the lamp.

We see on the diagram that the lamps are connected. If we follow one of these wires, for example, we see a symbol here with a vertical line and an arrow coming into it with the -- and designated 86. This is a transistor, an electronic circuit component, which is used in conjunction with the lamp to provide a path through which the electricity will flow, the current will flow, when the lamp is lit.

So the scheme for lighting this lamp is to provide a current flow through these transistor devices and through the various lamps.

So we might look at here, for example, the transistors labeled 86 where we see a 24 volt, meaning the size of the voltage supply analogous to the battery, how much drive current can come through this pair -- these transistors, following down the row of the matrix and coming up through the diode again, so that the current goes in the right direction, through the lamp and then out to complete the circuit back to the voltage supply.

Associated with these display means are anything associated with the lamp -- that would be the base and where the wires connect to the lamp, of course -- the diode, the wires here, but also critical components are anything that produces noise prevention in the device.

Noise prevention usually implies hardware. In the case of the patent, as was disclosed and listed yesterday, the noise prevention elements that are discussed are this transistor grouping right here, which is termed in the patent a low beta transistor, but what it, in effect, is an electronic device which would not allow current that pulses through this lamp when I strobe it to rise above a certain level in order that I either won't burn out the lamp, or, equally importantly, that I will not create excessive noise by the rapid pulsing current.

So this is shown on the block diagram because it is a critical part of the design of the system being associated with the noise prevention, and it is described also in the patent.

So the display activation means then consists of all the transistors, voltage source, lamp drive registers, et cetera. They are operatively connected to the computer in much the same way that the segment drives are operatively connected to the computer; namely, the register unit here, 58, is connected to the input/output unit 57; so that in order to send the desired status of a series of lamps to the display activation means, I simply use this input/output part under control of the computer program stored in the ROM, passing through the various buses and interconnection wires in the microcomputer, out from the input/output port

to the register, then to the lamp drive.

Again, because of the matrix connection, that sets up only the row connection, and I must use the corresponding column connection as shown up at the top of the diagram through decoder 61, which is also connected to the computer via line 72.

It is shown in the patent as coming out of the element 52, the random access memory. In the particular embodiment described in the computer, there happens to be some input/output capability in this chip.

So this also is an input/output capability just like element 57.

Hence under program control I can cause any set of lamps to light by selecting the column and the row.

"...operatively connected to the processor for activating the response means in response to a signal from the processor."

This is done under control of the program because it is the program that must sequence the system in such a way that it reads the signals when the switch is in, performs the scoring calculation, all the instructions in sequence, by calling upon the individual subroutines in the computer program, deciding what lamp to light, and then strobing the column, sending the information to the rows, and the net result of all of this work, which is many instructions, is simply the lighting of a light for a brief instance.

Element (g) is associated with the multiplexing of this unit and the cyclical and sequential scanning of that multiplexing. That, of course, is the heart of the invention, and so I would like to digress from reading the claim and discuss the multiplexing and then come back and read the claim on that, if I may.

I prepared a sketch here in order to discuss matrix multiplexing, and this is labeled PX-399.

We used the word matrix multiplexing synonymous with multiplexing throughout the patent, and

matrix multiplexing is the only kind of multiplexing that we consider is considered and disclosed in the patent.

This illustrates what matrix multiplexing is all about. It is the way that we get all of these devices to work together in real time, and so it is critically important.

I will first discuss it from the point of view of a matrix of lamps. Here is my diagram that we have associated with a lamp. The little curlicue inside that circle represents the filament of the lamp, and in order to light the lamp, we have to have electric current flowing through that element. It heats up and just gives off light, is the mechanism that takes place.

The whole trick is to get that current to go through at just the right time and just the right place.

We show here a very simplified matrix, much smaller than the one disclosed in the embodiment in the patent. This one has only two columns and has only two rows, and the rows and columns are labeled that way in the exhibit.

Q. Are the columns and rows interconnected?

A. The exhibit here has been carefully drawn with a loop shown wherever wires cross, and there is no connection intended. So if you follow down the column wires or follow across the row wires, you will notice that no row

wire connects to any column wire, but in order to select an element, we have to connect a lamp to a column and to a row.

So I have left out for simplicity here the diode that keeps the current going in the right direction, but aside from that, this is complete.

The connection is shown by a heavy black dot here (indicating). In order then to light the lamp, for example, called lamp 1 in the exhibit, I have to have current flowing out of row 1, which will come to the black dot, go through the filament, come to this black dot. It is now touching a column wire, go up to the column wire, and I need a battery to drive that current. Current always flows in a loop, so somewhere there is a connection, but the strategy is to choose a lamp that you would like to light, lamp 3, energize its row and column, and that lamp will light.

If you would like to light just lamp 4, simply choose column 4 and row 2.

So instead of having many wires coming out of the individual lamps, I need only one wire per row and one wire per column.

In the case of the patent, there are 16 columns of lamps and there are four rows. So I need only 20 wires coming from the electronic circuit boards in the

back down that long path into the playfield, and, of course, 16 columns of 4 rows would be a possibility of 64 lamps.

If I didn't do it that way, I would have to bring 64 wires down from the back panel down to the playfield, which would mean, of course, that I would have much more susceptibility to noise, not to mention the additional cost and the like.

Getting back now to the multiplexing, this allows me to select any particular lamp that I would like in the matrix, and this concept will work for any size matrix.

Now, normally --

MR. LYNCH: Your Honor, I would like to object. The testimony we already have is that matrix and multiplexing are not the same thing from the inventor. Now, Mr. Frederiksen so testified. It is one of the issues involved.

It is not involved in Claim 45, and what we have here, your Honor, is a smokescreen. Mr. Frederiksen, the inventor, said you can multiplex without a matrix.

THE COURT: Well, I don't think this witness is saying anything contrary to that. He is saying --

MR. LYNCH: He is saying they are synonymous.

MR. SCHNAYER: In the patent.

THE COURT: He says in the patent.

MR. KATZ: Right.

THE COURT: He says that this patent incorporates matrix multiplexing, and that is why he is discussing them together.

MR. LYNCH: This is part of the smokescreen, your Honor. Matrix is in Claim 46. It is in Claim 46 and not in Claim 45, and part of this entire effort is an effort to mix things up --

MR. KATZ: Your Honor --

MR. LYNCH: -- contrary to what the inventor already originally indicated.

MR. KATZ: Your Honor, you will see that that is not true when we discuss it.

THE COURT: We discussed this early on, didn't we?

MR. KATZ: Yes.

MR. LYNCH: Yes, we did, your Honor. This was part of my opening statement and it was part of the early discussions the Court had on what was the invention here.

MR. KATZ: Your Honor, in Claim 46, which Dr. Schoeffler will get to, matrix was used as an antecedent, as a basis, because it is going to talk about sets of elements in a matrix and it is going to talk about a particular embodiment of the broader concept.

The entire patent relates to matrix multiplexing. The examiner found that in the Patent Office, and no one has talked about any other kind of multiplexing except matrix multiplexing.

However, there are various ways of doing it, and Claim 46 talks about a particular way where you have at least one matrix that has a particular kind of set of elements, and you multiplex those elements in the matrix.

So in order to talk about the sets of elements, we had to say they are in a matrix, but the entire patent is matrix multiplexing, and the witness is going to testify about all of these subjects and try to present it in a very clear way so that it is understandable.

THE COURT: Well, we are going to have to do something about the linguistic difference between Claims 45

and 46 at some point, but I don't think this is the point.

MR. KATZ: That is right.

MR. LYNCH: May it please the Court, one point that I would like the Court to keep in mind is if any one of those claims had been changed in the re-issue proceeding, there would not have been a liability of the defendants here. Those claims had to be preserved the way they were going in, otherwise intervening rights of the statute would have caused the fact that neither Williams nor Gottlieb would have to be here today.

Essentially the pinball business has folded up. If those claims had been changed by one word, your Honor, by one single word, the effective date of the claim was November 15, 1983, a time when the pinball business was dead.

The thing that we are talking about here is past damages, and what we are talking about is a flexible, elastic claim that is sought to be manipulated from what was in the Patent Office, where they talked about multiplexing to matrix multiplexing, and that is what we are seeing here, may it please the Court.

THE COURT: All right. Well, I think that that is proper argument and it has to do with what I am going to do with all of this evidence ultimately, but I think I should receive the evidence because plaintiff's theory is

contrary to what you have just indicated.

MR. KATZ: That is right.

THE COURT: So go ahead.

MR. GOLDENBERG: The problem is, Judge, are we going to deal with the patent as issued by the Patent Office or as they are proposing to attempt to re-write it in this Court?

THE COURT: Well, the plaintiff says that is the way it was issued in the Patent Office.

MR. SCHNAYER: We will prove it.

THE COURT: It would be a lot easier if we didn't have this means-type of patent.

MR. LYNCH: Your Honor, as I am --

THE COURT: I am sure I must have had means patents before, but I don't ever recall running into this particular problem.

MR. LYNCH: Your Honor has already decided this issue. I can't remember the case, but my associate has it here.

THE COURT: That shows you how little I remember about what I do.

All right, the objection is overruled.

MR. SCHNAYER: Thank you, your Honor.

BY MR. SCHNAYER:

Q. Will you please continue, Dr. Schoeffler.

A. We were discussing matrix multiplexing for a set of columns and rows of the lamps. And we had indicated that in order to perform this multiplexing, I need to provide the rows and the columns -- those are wires, and I can observe the connections of the lamps, so there's no doubt that these are connected in a matrix.

And then I must provide electronic circuitry separate from the microcomputer -- the activation means -- to supply the necessary voltages and currents to the lamps, so that I can cause these to be activated.

Now, in matrix multiplexing, when we enable or select a column like this, we notice that one side of all the lamps that are in that column are connected to that line.

And so once we choose column 1, potentially we can do anything we want to all the lamps in the row; two lamps in the example, four lamps in the patent.

Then I can send out a signal that says: "Light this lamp, don't light this one." Or: "Light this one and don't light this one."

Matrix multiplexing inherently assumes that the way that we light the lights will be in a pulsating

manner, that is, instead of connecting row 1 and column 1, and lighting lamp 1 and leaving it on so that it would be lit continuously, that would require me to always have this connection. And then I couldn't light the other lights.

And so, of necessity, when I connect things in a matrix, what I must do is momentarily select a column, send out along this row interface circuitry the status of each lamp in the row, and cause all the lamps that are supposed to be lit in this column to light.

And then I leave them on for an interval, and then I move on to the next column.

THE COURT: And the reason you don't light the wrong light on the way to the right one is that the switch from the wrong light isn't open -- rather, isn't closed.

THE WITNESS: That's exactly correct.

And the computer knows which ones to light, and so it sends the right pattern here: "Light this one, don't light this one." And so this switch is closed, this one is open -- the electronic equivalent of the switches.

That is exactly correct.

BY THE WITNESS:

A. Now, once I have allowed this column to stay on for an interval -- and that interval in the embodiment disclosed in the patent is about one one-thousandth of a second -- I then switch to the second column.

The microcomputer goes back to its scratch pad memory and says: Which lamps should be lit in the second column?

Aha, both of those should be lit, let us say. So it now switches this column to -- from column 1 to column 2 in the column interface circuitry.

It closes electrically the two switches here, and both of these lights light. And we leave those on for a thousandth of a second.

Then we move on to the third column; look up the status of the lights, and send that out.

And so, if your eyes were very quick, what you would see is lamp 1 go on for a thousandth of a second, then both lamps 3 and 4 go on for a thousandth of a second, then perhaps neither lamp go on for a thousandth of a second, et cetera, depending on the game rules and the current status of the game, depending on how many you had hit, et cetera.

because, as soon as I connect in the matrix, I can get at any one only if I select the column and the corresponding row.

So this is identical to that which we have in this matrix on Exhibit 399 a moment ago.

Connected between each column wire and each row wire is one of these switches as shown here.

BY MR. SCHNAYER:

Q And those are labeled switch 1, 2, 3, 4?

A Yes, they are labeled switches, and the rows and columns are also so labeled.

Now, the objective here is to read the status of the switches into the microcomputer so that it can make the decisions about which lamps to light.

The column and the row interface circuitry have -- not shown in this oversimplified block diagram all of the necessary electronics here, so that the closure of a switch can be turned into a current -- but basically what I do is the same thing.

If you would like to know whether switch 1 is open or closed, you energize column 1 of the matrix -- and so now your path comes down here, potentially goes through the switch -- you don't know whether the switch is open or closed -- to the row.

You supply some voltage to that row. If there

But the eseence of the matrix multiplexing is to repeatedly energize the columns with the proper values in the rows, to get the correct lights lit. And, of course, so that they look continuous, it's got to be -- the actual product cannot flicker in any way -- this must be fast enough so that these lamps cannot cool down in between the strobing of the columns, the lighting of the columns.

And so it must be fast enough that they look as though they were continuously on.

This is the essence of matrix multiplexing of lamps. And inherent is the requirement: Fast enough so you don't see the flicker, and -- such that the lamp stays on -- along with the proper selection of these at the right time.

Now, if we may look at Exhibit PX-400, which looks almost identical, except that I have replaced the lamps by the switches. And again I've left out the diodes, so the currents go in the right direction, for simplicity of the exhibit.

Let's contrast that matrix and its multiplexing with this matrix and its multiplexing, because it has of course a different purpose, namely, to detect the closure of switches.

Same arrangement. Columns and rows. These are wires.

Same arrangement. Column interface circuitry,

is any -- if the switch is open, nothing will happen because the current can't get through an open switch.

But if it's closed, the current will flow, and that can be detected by this input/output circuit in the computer, and hence read in.

So what the computer is actually reading is the presence or the absence of a voltage, in order to determine the closure of a physical switch.

All of the problems of bouncing of the switch, and so on, that's -- none of that is right here. That's all in the software in the microcomputer itself.

The advantage of a microcomputer is, it can do the debounce kinds of things, make sure the switch was previously open -- otherwise it's not a new closure, and I don't want to give a score. And then when it closes, make sure that it's not bouncing, however we do it, all of that would be done here.

The key, of course, is the real time problem.

The real time problem in the case of the lamps is to make sure that they stay lit and look continuous; and, secondly, that they turn on quickly after a target is hit.

In order to do that, I first have to determine that the target was hit. And so the key is, to make sure that you actually detect the switch closure.

And so the procedure would be as follows:

Energize a dolumn. The computer under program control would go to the section of the computer labeled "switch," that we mentioned, and read the values of all the switches, that is, the presence or absence of electric current, into here, and coming into the computer then would be the information: Nothing is closed of these switches.

Fine. Go to column 2. Again, do the read, with all the noise immunity considerations; read it twice, et cetera. But nonetheless, reading these switches.

And then we find, switch 3 is open, but switch 4 is closed.

As soon as I detect that the switch is closed, that's an event. That's an event that has occurred in real time, and now I must respond to it.

And so I go to the appropriate section of the game rules as implemented in the computer program, and do whatever has to be done when that switch closes.

THE COURT: Tell me again the means by which the switch is closed when the target is hit by the ball.

THE WITNESS: All right. The target might be, for example, that slingshot piece of rubber. And right behind it, if we imagine my first finger and thumb is a leaf switch, a springy switch that I can -- when the ball hits the rubber, it physically just closes the switch --

THE COURT: It's physical.

THE WITNESS: -- it is a physical ball hitting it. That is the response means -- the signaling means.

MR. SCHNAYER: If your Honor would like --

THE COURT: No, no, I recall that now, the leaf switch.

MR. SCHNAYER: Fine.

BY THE WITNESS:

A. And it's because they are mechanical closures that some of the noise problems must be handled properly.

Having read the column of switches and found switch 4 is closed, I go to the section of the program that has to respond to that. And that might be, for example, "Close light 3," which is in row 1, column 2, "and implement a score by 100 points."

And so the instructions there would then be stored -- the information would be stored in a scratch pad memory that switch 4 has just closed, and I must light lamp --

I think I said 3 in my example.

I store the fact that switch 4 has closed, because I'm going to keep scanning those switches, looking at them. And when a ball hits a switch, it isn't like that (indicating).

It hits the switch and stays closed for a fairly long time. The fairly long time might be anything from five to twenty milliseconds, in a typical case, unless the ball comes to a halt there for some reason.

But in general it's brief compared to the times we're accusstomed to, but long compared to the times, the speeds at which the computer operates.

And it might and probably does happen in many cases that I will look at the switches over and over again, and so that I may see two or three times, possibly, that switch 4 was closed, and I don't want to do anything to the score.

So I store that in the memory. And then change the status of the light that is associated with it, and the digits that are associated with the increase in the score.

So again, I energize a column, read in the switches, look at them, after doing the noise immunity things, and if one is closed, process it.

Then move to the next column; read in the switches; clean it up from a noise point of view; do whatever you have to do when that occurs, over and over and over again.

Now, the language that is used is cyclical and sequential matrix multiplexing, and let me --

MR. LYNCH: Objection, your Honor. That is a mischaracterization of the language.

THE COURT: What is the objection?

MR. LYNCH: It does not say, "cyclic and sequential matrix multiplexing," your Honor.

THE COURT: All right, multiplexing.

MR. SCHNAYER: I believe the witness was characterizing what he read.

THE WITNESS: I was careless is what I was. It clearly does say, "cyclically and sequentially enabling of the columns." I apologize.

BY MR. SCHNAYER:

Q This is PX-401 for the record.

A A cycle according -- in a dictionary, is an interval within which a round of events are completed, reguarly recurring events of some kind.

By enabling we mean the selection or enabling of a column of the matrix. So the cyclic enabling of a column implies enable this column and read the rows, enable this column, read the rows, or in the case of the lamps, enable this column, light the appropriate rows, enable the column, light the appropriate rows.

Of course, this is going to be done on some

kind of a repetitive basis.

The events are, for example, the closing of the switches that we have here, and we observe that the objective of the game is to run it in real time, which means from a real time response point of view, that from the time the event occurs, the ball hits the target and closes its corresponding switch, I have a certain length of time in which I can respond.

By respond I mean I have to detect that the switch is closed. Then I have to run off in my computer program and decide what to do about it: Oh, yes, for switch No. 19, I must light a light, and then I must get that light lit, okay, and that is the response time.

What determines that is the feel for the game and an individual, how long do you expect after that ball hits to see the light light.

So for each event there is an associated real time.

In the case of the switches then during this cycle, we must detect these events. And we do that by enabling repeatedly column 1, column 2,up to 16, back to column 1, over and over again.

I have drawn this diagram here showing as time advances from left to right the way we might look at these switches. For example, these little arrows are meant to indicate the instance at which we look at a particular column of switches, like column 1.

So at this instant of time at the left of the line, I look at column 1. Let's suppose that it may or may not be closed. Sometime later I come back to column 1. In the meantime, I have done many other columns, enabled them. But, specifically, I come back at a later instant of time and look at them again and again and again and again.

Since the objective is to respond in real time, my only requirement is that I detect the switch in time to respond, in the response time associated with that switch closure, whatever it is. I have drawn the diagram specifically to emphasize that this means I do not have to do it periodically with equal spacing necessarily, so that whether or not the spacing between the reading of the switches is equal in time is not really very important. The only thing that is important is the length of that interval, because if you wait too long, you may either miss a switch or not have time to

respond with the corresponding display activation or score calculation that is associated with it.

So the important thing about cyclic is that I keep getting back here fast enough to detect the switches.

Now, in the case of the lamp, I am cyclically enabling the columns like this. And here the objective is that once I decide to light a light, this cycling must be fast enough so that from the time I decide to light the light until I next get around to that column and the light can turn on, that that, too, be in the real time response that we mention.

But then once it goes on, I have got to make sure that I hit it often enough so that the light stays on.

As we said, inherent with matrix multiplexing of displays are the large pulses of current because I am only going to light them for a short interval and light them over here and light them at a later time. So I really have to hit them quite hard, so that on the average they appear lit and equal brightness to you.

As a consequence, Frederiksen defined the word, sequential, and he said that by sequential, cyclic and sequential scanning, he means that we proceed from column to column in such a way that the lamps stay bright enough and not too bright, which implies that if this lamp has had its turn to be strobed or enabled and we move on to the others, that we

should complete all those before we get back to this, so that it is strobed the right number of times each second, so the brightness is correct.

THE COURT: What does sequential add to cyclical?

THE WITNESS: It adds to cyclical the connotation that we do not return to this column before completing the others.

THE COURT: Doesn't cycle imply the same thing?

THE WITNESS: The cycle may not. A cycle is simply a sequence of events.

THE COURT: That is the point.

THE WITNESS: And if you included the event of coming back to column 1 four times, that would be different than what is taught in the patent.

THE COURT: That would be part of the sequence.

THE WITNESS: That would be part of the sequence, but the patent very clearly, whenever it goes through this, laboriously points out how you do this and then you move to the next one, then you move to the next one, over and over again.

In the testimony I read of Frederiksen, he made a point of that because of the fear that if you came back to this one, let us suppose that in a certain interval you were to sample each one of 16 columns; that if instead of that you somehow hit the first column twice and missed the 13th column, one light would be too bright, one light would be too dim. It wouldn't make a successful commercial product.

If there were reason to --

THE COURT: I understand why you are doing it. I am just a little confused as to whether there is a redundancy there in the use of the two terms. That is all.

It seems to me you wouldn't have a nonsensical cycle and, therefore, any cycle would be sequential, according to the logic of what you are trying to do.

THE WITNESS: That is right. Almost all the time there is no reason in the world to do anything else. Now and then there might be a reason, and I suppose that is what he had in mind because even if you are off doing something else because of game rules and so on, you have to keep the lights lit and so you have to keep this pattern moving, and that is what is described in the patent just from the beginning to the end.

As a consequence, we can imagine cyclical and sequential enabling to be the cyclical and sequential enabling of the column, read the switches; cyclical and sequential enabling of a column, light the lamps.

These could also be digits. The individual digits in the display could be connected here instead of the lamps, and they usually are.

So that the concept applies to all of the response means that are in the patent and the signaling means this way.

BY MR. SCHNAYER:

Q. Did you misspeak? You said response means. Did you mean display means?

A. I don't remember what I said.

Q. Maybe you could repeat your answer.

A. What I meant was the concept applies to both the lamps and the digits, which are the two display means in the patent, and to the switches, which are the signaling means in the patent, is what I meant to say.

Q. Thank you.

A. With that aside, we can come back to the claim, and I would just like now to indicate the matrix that is in the embodiment in the patent more completely.

The columns of the matrix are the lines labeled 40 on Figure 5 of Exhibit PX-412-C.

This is called a decoder, a 1 of 16, and it is called the decoder because the computer sends it a signal along the line 72 that is the number of the column that you wish to enable. That would be a number like 13 or 7 in the form that the computer understands, and what this electronic device does called a decoder is cause one of the 16 lines, namely, the one that the computer has indicated to us, to be activated and the others to be inactivated, and hence that is how I select a given column.

In the embodiment described in the patent,

the matrix is a single matrix; namely, if you follow down any column, I find the various means that we have discussed. I am looking at PX-412-B, which is Figure 4 from the patent.

We see the matrix displayed there, and what is implied here is that because the various sections, namely, the lamps, the switches, a special row of the matrix with special switches, and the digits are all connected into a single matrix, the implication is that in this column we have four lamps and then we have a connection to a switch that is in the row labeled test line, number 45, and then we have a digit in the row that is labeled 46, and then we have possibly four switches in the rows of matrix labeled 46.

Q. Excuse me --

A. That is not 45. That is 43, excuse me.

Q. 43, it says lamps and flippers.

Did you possibly mix up the two rows here?

This one here says target, this being 44.

A. Yes.

Q. So which are the switches in the diagram?

A. I did it yesterday, too. I am sorry.

The switches are labeled 44 and the lamps are labeled 43, but if we take a column, such as the column that is labeled A -- and you will notice at the bottom of Figure 4 that the columns are labeled 0, 1, 2, 3, 4, and 5, and then when they get above 9, instead of 10, 11, 12, they are labeled A, B, C, D, E, F, which happens to be common computer terminology but are equivalent to calling them columns 1 through 16.

If I am more careful here, if you follow down through one of the columns, you have the four switches in the switch section, another switch in the test line section, a digit in the display section, and then some lamps in the bottom section. Not all of the columns and rows are connected up on the schematic because of the number of lines that would have to be shown, but in effect then the enabling of the columns is done for all of the elements at once.

Instead of as I did in my example, my simplified example, where I had separate matrices, the embodiment in the patent happens to have a single matrix so that one can enable everything in one column at exactly the same time.

Q. Dr. Schoeffler, the rows and columns that are the 16 columns and then the rows associated with them, as shown in PX-412-C, are those actually connected together or are they as in the example, where the rows and columns are not connected?

A. The elements in one column are electrically connected together; that is, one can trace a wire from the top to the bottom. So that if you energize one end of that wire, everything in that column is energized.

Now, the rows are not because, for example, for the switches, I have to read those switches into one port on the computer, namely, this register right here. The lamps, I have to send signals to the lamps. Those come from this, and my test line that I have, number 45 across the diagram, is shown coming into the processor through its own location across the top.

So depending what I want to do in a row, I can do different things, but the concept of enabling means select everything in the column. Then the computer, using its program, can do selectively lamps, digits, and

switches.

Now, we pointed out that that was very important yesterday from a noise immunity point of view because we said if we set up a particular column and now caused the lamps to be lit, we are sending big pulses of current out. We really do not at that time want to be suddenly reading the switches because we would anticipate that would cause noise.

So I will deliberately set up the computer program so that I will handle the digits and the lamps first. Let the noise go away and then read the switches.

This is what the noise immunity scheme that we called interlocking or program sequencing was intended to carry out, and it is very key that in order to take advantage of that kind of noise immunity, you must have that kind of control over the device; namely, in order that the program can do that properly, the hardware and the operation must be such that I can, for example, synchronize or control exactly when things happen.

If the lamps and the digits were just going on and off at odd times and then I would have no idea when I could safely scan the switches, then I would lose the ability to do the interlocking control, and I would have to do my noise immunity in some alternate or equivalent manner.

So the single matrix as disclosed in the patent merely makes this approach to noise immunity very straight forward in the computer program. When we looked through it, we indicated the sequence in which those were done in order to illustrate that.

Now, if we may read the whole claim --

Q. Dr. Schoeffler, let me just ask you one other question or a couple of questions.

A. I am sorry.

Q. I notice there are some blank spaces in the matrix. What do those indicate?

The blank spaces I am referring to are column 44 on PX-412-B.

A. The rows that you refer to in Figure 4 of that exhibit correspond to the switches and simply indicate that the embodiment described in the patent was capable of having a maximum of four times 16 switches that could be closed, but there were not that many in the particular embodiment that is described.

bLB

So if you have nothing to do, you simply do not connect the switches. The column line goes right down, it is just that when it goes by that row, there is no switch to connect to. So there is nothing to read.

The significance of that was disclosed in one of the noise immunity -- or one of the real time response categories where we pointed out that if we have a switch that can close currently with another switch, at the same time, that we would put it in a column by itself, since we have extra space, and then the spinner switch when we scan it can never conflict with another switch in the same column, because for noise immunity purposes, the switches that we group together in a column are always assumed not to be able to close at the same time because I use the reading here and check it to see if they are closed, and then I assume it is noisy because it is deliberately set up in the patent so that they should not close at the same time. If they can close at the same time, you should put them in separate columns. That is the significance of the blank spots in the switch matrix.

THE COURT: Why don't we take ten minutes.

MR. SCHNAYER: Thank you.

(Brief recess.)

THE COURT: I haven't really played one of these machines with all of these different considerations in mind, and this might be a good time for us to take a minute or two and just have you run through one of these games so I can see all these lamps light up and digits go on and that type of thing.

Can we take a few minutes to do that?

MR. SCHNAYER: Surely, your Honor.

THE COURT: I think this can be off the record, too.

All we're going to do is play -- why don't we take the electronic Flicker and play that.

MR. SCHNAYER: Do you want to do it?

THE COURT: Why don't you do it, and I'll just watch and see what happens.

(Pinball machine played.)

MR. TONE: Your Honor, may I address a couple of housekeeping matters before Mr. Schnayer resumes with the witness?

THE COURT: Yes.

MR. TONE: During Mr. Goldenberg's cross-examination of Mr. Frederiksen, he referred to an Exhibit 14-C, and we asked the Court to impound that testimony.

We've checked, and that need not be im-

pounded. The information is no longer confidential, so that can be released.

THE COURT: Exhibit 14-C may be --

MR. TONE: I'm sorry. That's Defendants' Exhibit 15-C.

THE COURT: 15-C -- what do you say -- may be --

MR. TONE: I suppose you could say the impounding order --

THE COURT: -- uncloaked, unmasked.

MR. TONE: All right. I think we understand it.

Also, defendants used their Exhibit 12-F in cross-examination and requested that we produce the press release on which the exhibit, which is a Wall Street Journal story of June 14, 1980, was based.

And we hand over that press release.

THE COURT: All right.

BY MR. SCHNAYER:

Q Dr. Schoeffler, will you please continue with your explanation of claim 45, the meaning of claim 45?

A Yes. Prior to the break we had completed item (f) in claim 45, and had discussed multiplexing and cyclical and sequential enabling, and we're just starting to read claim (g) or item (g) in claim 45.

Item (g) reads: "Multiplexing means opera-

"tively connected to the processor for cyclically and sequentially enabling the signalling means to signal the processor that its associated response means has detected the ball."

Referring to Exhibit PX 412-C, figure 5 of the patent, the multiplexing means include a single matrix, which includes both the switch -- all of the switches, the lamps, the digits, and the high priority switches, as indicated on Exhibit 412-B.

And as we pointed out earlier in figure 5, lamps, namely lamps, switches, digits, priority switches, such as this nature, with the enabling electronics being the decoder, the 1-of-16 decoder, which can connect to one of the columns and select one of the columns at a time.

Q And that's labeled what?

A That's labeled No. 61 on the figure. And being connected to the microcomputer through an input/output port via the lines labeled 72 and the input/out port on the element labeled 52 with the corresponding rows of the matrix being controlled by the registers 58, 59 and 60, and the corresponding display activation means, switch response means, that we pointed out on the diagram before.

And for cyclically and sequentially enabling the display activation means to activate its associated -- I am sorry.

The claim item G as a whole calls for multiplexing means that can cyclically and sequentially enable the signalling means to signal the processor and to enable the display activation means to activate its associated display means; and that multiplexing means is the 1-of-16 decoder I mentioned, No. 61, and the associated electronics that I indicated whereby the selection means enabling or selecting a specific column, and then all of the elements in that column are simultaneously enabled.

Q Dr. Schoeffler, you were pointing to some circuitry over here. You said this 1-of-16 decoder, and you indicated some circuitry over here.

What was that?

A The circuitry I was pointing to was the microcomputer itself, which includes the CPU chip, the RAM, and the bus lines, 54, 55 and 72, which connect that into the computer.

In addition to the electronics for enabling, specifically enabling the columns not shown on the schematic shown here coming out of the decoder 61, but described in the patent, are noise prevention means that we listed the other day, yesterday; namely, in this case,

transistors in the column which are such that when we switch from one column to another, the transistors have the characteristics that they turn on slowly. Mr. Frederiksen used the terminology, slow turn-on transistors, which shield the switching the rapid change to the switch, from the elements in the column. transients. The other noise prevention techniques we mentioned separately when we were discussing the lamps, in particular, the transistors which prevent the pulses of current to the lamp to exceed a certain value, which might be unsafe for them, and also to limit them from a noise prevention point of view.

The multiplexing is carried out under the control of the program, stored in the ROM 53, and executed by the CPU chip 50, in such a way that the columns are enabled cyclically and sequentially starting with the first one, moving through on a cyclical and sequential basis. While each column is enabled, the interlocking among the various rows of the column are carried out. Specifically, for noise immunity purposes, the sequence proceeds as follows. In the multiplexing section of the program, the particular column to be selected is first determined by the processor, the next column to be selected, and output to the decoder 61.

Next the lamps and the digits: those lamps which are to be lit in that column and the value of the digit that is in that column are set up in the corresponding registers that interface or connect to the lamp and the digit rows of the matrix.

Actually I misspoke. It is done first the lamps and then the digits and then the column, but the point is they are set up in advance under program control in sequence, and only when they are already in the embodiment described in the patent are they strobed.

The system moves to the next column, and all of the noise-producing pulsing is done at that time. In particular the signal that synchronizes them can be seen here as the line that comes in the bottom of the decoder 61, the line shown there, and that line is also shown following it connected into the lamp drive and into the segment drive and being connected back to the CPU chip.

So the program was specifically set up to choose the column, set up the information to be displayed, and then strobe it on.

So suddenly we switch from the previous column now to the next column. There will be pulsations of current. The lights and the digits will light. Noise will be generated and the like, but then later in

the sequencing of the program that is carrying out the cyclical and sequential enabling, the switches are read at a time then when that noise presumably has died down so that we separate in time this very critical operation of reading the switches from the time that we are sending the signals to the noisy devices.

Q Dr. Schoeffler, I think you referred to this as lag sensing. Is there a name you could give that?

A The noise immunity technique that is used to separate and prevent the switching transient from coming into the microcomputer has been called lag sensing. It is associated with a time delay. Let things turn on very slowly; don't do it very rapidly, as we might in a faster kind of application.

Q Does that also involve sensing the switches after that noise has died down?

A The whole objective of the sequence of the statements in the computer program and the noise prevention transistors, the slow turn-on transistors, is to put off in time the instant when the switches are read to a safe time.

The noise is there; you have to live with it, but you want to time things so that you don't do things at a particularly bad instant.

The last item associated with element (g) is the inherent self-cleaning capability that results from

the cyclical and sequential enabling.

We made the point that when we enable a column of a matrix and strobe the elements in that column, of necessity we had to do that momentarily because otherwise we would have to leave the lamps on for a long time. As a consequence, the cyclical and sequential enabling will move from column to column to column and then repeat, repeat, and repeat. The program is specifically organized so that every time a column is enabled, the program goes back to its scratch pad memory in element 52, looks up again what the value for the lamps should be and the value for the digit should be, and outputs it fresh, implying that if despite all of the effort in noise prevention and noise immunity, noise does get into the system on some of the lines connecting these and inadvertently the wrong lamp is turned on in a cycle, the next time around when the cycle repeats, the noise will be different and perhaps not there and we will output the correct signal to the lamp at that time.

Hence in the pinball game, as we 60 times a second light a particular column of lights, if one of those times noise caused us to light the wrong set of lights, it would only be on for one one-thousandth of a second, and it is unlikely that we would observe a pulse in the lamps that rapid.

This is what Mr. Frederiksen referred to as the self-cleaning aspects of the cyclical and sequential enabling of the multiplexing array in the embodiment described in the patent.

Item (h) in Claim 45:

"Said processor having means for storing the signals from the signalling means enabled by the multiplexing means in the memory means...."

This portion of the claim is referring to the signals enabled by the multiplexing means. The multiplexing means enables a column at a time, and so when we read the set of switches in the column that are enabled in the embodiment, we read in the status of four switches at one time.

After performing the necessary noise immunity tests on those signals, they are transferred through the register into the I/O port 57, into the CPU chip, where they are operated on by the appropriate series of instructions in the program called switches.

When they are accepted finally, they are sent to the scratch pad memory RAM, which is the means disclosed for storing the values of the signals.

The location of the signal is determined by the computer program and is known to the computer program, so they can be retrieved at a later time.

Each column, of course, must be stored in a separate location in this RAM memory, because, as I sequence through column after column, in order to debounce this switch, I have to know what I read last time.

And so if one were to look inside the random access memory, 52, you would see exactly a list of what switch settings you read the last time you ran through the cycle.

And all the processor has to do, the microcomputer has to do, is look that up and can compare it to what it has read currently to see if the status has changed in any way.

Continuing with (h):

"for addressing the program means and the memory means."

By addressing the program means and the memory means, we mean selecting a specific location in the memory means, the random access memory, where, for example, the contents of column 4 were stored last time.

And by addressing an element in the program means, I mean the microcomputer being able to selectively access either data or the program instructions, whatever is stored in the read only memory.

This is inherent in any microcomputer system. That is, a mechanism for addressing and provision

for wires to interconnect the chips for that purpose is standard in every microcomputer, including the one that is disclosed in the embodiment in the patent.

Hence, the lines 55, 57, 54 and 56 connecting the various components in the microcomputer are the physical mechanism for carrying the addresses; and the logical characteristics are known inside the computer itself, namely, the program as set up by the programmer decides where to put the data.

For example, column 1, I will put over here in this portion of the memory at location 1; column 2, I might put here; column 3 I might put here, so that I can go back and get it at a later time.

It's just like a file where I can go back to it and get it back out again.

Q Down here (indicating).

A "... and for signalling the display activation means enabled by the multiplexing means, in response to the program means and the memory means."

The signalling of the display activation means results from the computer program looking up and carrying out the game rules, using the instruction sequences stored in those various groups of instructions throughout the computer program; deciding what lamp to light and what digit to display, or what solenoid to

activate; and then sending that information to the appropriate registers, when the appropriate column is enabled.

When the calculation is done, that information is stored in the scratch pad memory, 52. Then, as the multiplexing proceeds, when it gets to the correct column, like column 8 -- if that is where my target is -- at that point in time the data is accessed by the processor, following instructions from the computer program, and these data values are sent out to the lamps; when the column is strobed, the lights light in response to the switch that was detected on a previous scan.

And that completes element (h) of Claim 45.

Q Now, Dr. Schoeffler, let's refer to claim 46. And could you please explain the meaning of claim 46.

And claim 46 is on PX-405 in an enlarged blow-up.

Excuse me. Let me just restate that: Please read claim 46 on the patent.

A Yes.

Claim 46 calls for "the game of claim 45."

We just indicated that all of the elements of claim 45 read on the patent and are included in claim 46.

"...wherein the signaling means associated with the respective response means and the display activation means associated with the respective display means..."

The signaling means associated with the respective response means, are of course the switches associated with the targets on the playfield that get closed when the ball hits the target.

The display activation means associated with the respective display means are the elements -- are the electronics in the embodiment disclosed in the patent that cause the display means, either the lamps or the digits or both, to be lit.

So reading this again: The signaling means and the display means are operatively connected in a matrix. And this -- this -- this means that both the signaling means

and some display means are connected in at least one of the matrices that might be present in the system.

Saying it in another way: There must be at least one matrix in which we have both signaling means and display means connected.

In the embodiment disclosed in the patent, the switching means, the switches here, and both the digit display means, and the lamp display means, are all connected in the same matrix.

And so in this case -- and, in fact, there is only one matrix in the embodiment described in the patent -- and so that is the matrix.

And both the signaling means and the display means are operatively connected -- are connected in that matrix.

"...operatively connected" means that the -- let me say that differently, if I may.

"...connected as a plurality of sets of elements..."

"Set" is used in the conventional sense of the word set, namely a group. And the connection in a matrix is inherently a group because, as we have indicated, all of the elements in a column of the matrix are enabled simultaneously when we select a column of the matrix, by the very nature of the matrix, and hence the set of elements are all of the

things that are connected in a particular column of the matrix.

In this particular case then there would be four lamps, a digit, four switches, et cetera. The things that we showed earlier in the embodiment in the patent were connected in a single column.

So we have a matrix in which we have both signaling and display means connected as sets of elements. The plurality refers to more than one set of elements, and, hence, more than one column in the matrix.

"The multiplexing means having means for cyclically and sequentially enabling each set of elements in the matrix" -- the cyclical and sequentially enabling is exactly the same as we described previously; namely, the decoder 61, which under control of the microcomputer selects a particular column to be enabled, and under program control, selects the values of the lamps to be lit and the segments to be displayed, controls the sequencing of the turn on or switch from column to column and the lighting of the lamps and the digits, separating in time the reading of the switches, under program control, to give an adequate real time response to provide adequate error recovery capability with the example being the stuck switch error, which we discussed under error recovery yesterday, and which is described in the program associated and disclosed with the patent, and

providing the noise immunity that we also described yesterday including the current limiting of the transistors, the slow and careful turn-on of the columns of the matrix, and the noise immunity considerations that are part of the program notably reading the switches twice to check that the reading is correct and not noisy, insuring that the switches read have changed from one cycle to the next called debouncing of the signals, and the interlocking or careful sequencing of the steps of the program control, so that they are done at the most advantageous time from a noise point of view.

Q. Dr. Schoeffler, could you please explain how Claim 47 reads on the specification?

A. Claim 47 calls for the game of Claim 45.

Claim 45 we have previously indicated reads on the specification and is included in Claim 47:

"Wherein said multiplexing means has an enabling rate sufficient to maintain an apparently continuous presentation of information by a plurality of display means simultaneously."

The plurality of display means corresponds to multiple lamps, multiple digits, all of which are present in the embodiment described in the patent.

The continuous presentation of information is the presentation of the information in a pulsating or a cyclically and sequentially enabled manner fast enough that the lights look as though they are on continuously, and that is disclosed specifically in the patent to be on the order of 50 to 60 times per second per column for the rate at which an individual column must be enabled, and that is described in column 4 in the vicinity of lines 35 to 39 of the patent.

Q. Does that also refer to the strobing of the digital displays?

A. Yes. Claim 47 uses -- it refers to display means, and either the lamps or the digits or both must be strobed at a rate, according to the patent, on the order of 50, 60 times per second in order that they look as though that they are direct connected or maintained permanently on during the interval when they are supposed to be on.

Q. Dr. Schoeffler, could you please explain how Claim 48 reads on the specification?

A. Claim 48 calls for the game of Claim 47, and we have just indicated that Claim 47 reads on the specification and is included now in Claim 48:

"Wherein the display means comprises:

a, a lamp" --

Lamps are present in the specification or

in the embodiment described and disclosed in the specification.

The lamps have a given voltage rating. The voltage rating in the preferred embodiment disclosed in the specification is specified in Column 12 around lines 33 to 53 to be approximately 6 volts, which is the size of the voltage that is required to be applied to the lamp if one wished to keep it on and keep it on continuously without burning it out.

It is the rate voltage specified by the vendor who builds the lamp and expects it to be lit continuously.

"Said game comprising means for supplying power to said lamp at a voltage higher than the said rating for a duration less than the period of said enabling rate..."

This is the inherent multiplexing where in order to do multiplexing, one must light the lamp only for a portion of the time.

The preferred embodiment described in the specification around lines 12 -- column 12, lines 33 to 53, specified a voltage of approximately 24 volts to be applied to the system and further specifies that the period is less than the -- a full period; namely, only the time that the column is enabled.

Q. Why is it necessary to apply a higher voltage for that smaller period of time?

A. In order to have the lamp light at the desired brightness, if you apply the vendor's recommended or rated voltage, it must be on continuously.

The light is produced by heating the filament to a high temperature, and if you just send a burst of current to the filament and then leave it off for awhile and then turn it on again, not enough energy is given to the filament to raise its temperature to give the correct brightness.

So if you are only going to light it a small fraction of the time, you have to light it very hard, really hit it very hard with a higher voltage. So that on the average overall you supply the same amount of energy as you would if you left it on all the time.

This is a source then of the noise that is inherent in multiplexing; namely, not only are we sending the voltage and current out in a pulse, we have to send a much higher current to that lamp than we would if we just left it on.

THE COURT: Do I understand you to say that there is no saving of electricity then?

THE WITNESS: Not a bit. Not a bit.

The purpose of the matrix multiplexing is

the saving of electronic components and control over the sequencing of programs for noise considerations.

BY MR. SCHNAYER:

Q. Dr. Schoeffler, will you please explain how Claim 49 reads on the specification?

A. Claim 49 calls for the apparatus of Claim 48, which we have just indicated reads on the specification and is included in Claim 49:

"(a) A matrix of sets of elements...."

The preferred embodiment disclosed in the patent is a matrix of sets of elements that we have shown in Figure 5, Exhibit 412-C, to be switches, lamps, displays, et cetera.

Item (b):

"Wherein the display action means associated with respective lamps are operatively connected as a plurality of sets of elements within the matrix."

So we are referring to the lamps only as display means, and they are connected as a plurality of sets of elements.

The sets of elements, when we use the word sets, that means group of elements. That corresponds then to the lamps in a column, and we have a plurality of columns of lamps within the matrix.

In the embodiment disclosed in the patent,

it happens to be 16 columns of the matrix.

Item (c):

"The multiplexing means having means for cyclically and sequentially enabling each set of elements of the matrix."

The multiplexing means include the decoder 61, which selects one of the 16 columns or sets to enable. So it is selecting which four lamps at any instant to strobe or light or be capable of lighting and its connection to the microcomputer, which is the number 50 on Figure 5, and the associated wiring registers that we have described previously and under program control stored in the ROM for actually carrying out the enabling of the columns in a cyclical and sequential fashion. That is totally a program function for carrying this out.

Finally, (d):

"Wherein the magnitude of said higher voltage --" that is being applied to the lamp for the brief interval -- "is approximately equal to the product of said given voltage rating of the lamp --" which we indicated in the previous claim is 6 volts -- "and the square root of the number of sets of elements in the matrix."

In the preferred embodiment, there are 16 columns, and Claim 49 is teaching that the higher voltage

must be then the square root of 16 times the manufacturer's rated voltage if the power is to come out the same, so that the amount of electricity used is the same, and hence the lamps achieve the brightness that they would if they were on continuously.

This calculation and the numbers are disclosed in column 12, line 33 to 53 of the specifications.

Q. Dr. Schoeffler, could you please refer to Claim 95 and explain how it reads on a specification?

Let me bring that up so it is more convenient to refer to.

95 is contained on PX-411-A and PX-411-B, two enlarged drawings.

A. The elements of Claim 95 are very similar to the elements of Claim 45.

The preamble of the claim calls for a game apparatus. The pin game specified in the patent is a game apparatus.

All of the remaining elements of Claim 95, except element (c), are effectively identical to the elements in Claim 45.

Claim (c) specifies:

"A player-operated means for affecting the motion of the physical means...."

And this in the machine described in the patent is, of course, the flippers, which one can use to cause the ball to be hit to a place on the playfield, and hence all of the elements of Claim 95 do read on the patent in the same way that it does in Claim 45.

Q. Dr. Schoeffler, what are the advantages of the invention as defined in Claim 45 of the patent?

A. The advantage of the invention as --

MR. GOLDENBERG: Your Honor, I object to this. We have had endless days on the advantages of this invention. I think the record is being burdened excessively on this matter, and I think the plaintiff --

THE COURT: I take it this is by way of a summary question. I doubt we are going to hear anything brand new.

MR. SCHNAYER: No, it is a summary question, your Honor, and it is not meant to be a long dissertation.

THE COURT: All right, overruled, and I am sure it won't take days.

MR. GOLDENBERG: Your faith is greater than mine, Judge.

BY THE WITNESS:

A. The advantage of the invention lies in two general areas.

The first is in the economy of wires and circuit elements; namely, because the components or elements, namely, the lamps and the switches and the displays, have been arranged in a matrix and because inherently a matrix connects all of the components together with a single wire corresponding to the column, we have to run wires, in this case 16, from the electronics boards in the back to the playfield to get at all of the elements. We must also run wires corresponding to each row. So that the number of wires is equal to the

number of columns, plus the number of rows.

If they were not connected in a matrix, then the number of wires would be the product of those two, and that is a much larger number.

So there is an economy in wiring.

lbl

In addition, the electronic components for making those connections, like the decoder, provide an economy of circuit elements. So the electronics can be more compact and lower cost.

The second advantage of the invention as specified in claim 45 is related to the use of the microcomputer itself.

And that is a very great advantage, providing such things as the ability for the microcomputer, when it is not being used to control the game, to actually help technicians do mantenance on the machine by diagnosing malfunctions.

That is, separate programs can be provided that light lights in the proper sequence, and so a maintenance person can simply look at the game as this program sequences through and, knowing what is expected, can determine what has failed.

This is a very effective advantage.

New features can be added to the game -- because the microprocessor is so flexible -- by adding to the computer program.

And, finally, the game itself can be modified without changing the hardware; by simply changing the program, the game rules can be changed, and in effect present a cosmetically different game with different game rules without

the cost of rebuilding all of the hardware or the cost associated with redesigning all of the electronic circuits.

MR. SCHNAYER: Your Honor, I believe it's about 12:20. We're about to go into another subject.

THE COURT: All right. We'll break for lunch.

Well, actually --

MR. SCHNAYER: This will be the break.

THE COURT: -- that's it for a while, isn't it.

MR. SCHNAYER: Yes, your Honor.

MR. GOLDENBERG: Judge, as you recall earlier in these proceedings I made mention of this matter in Detroit before Judge Gilmore.

I take it there's no question that you'll be occupying the balance of this month with Plaintiff's case, what time is available to us?

MR. TONE: I think that is probably true.

As I said, we are in the process of trying to streamline it, and I hope it will be shorter than that, but --

THE COURT: I hope so, too.

I'm committed to do something else starting February 6th for three weeks. I'm going to be in a joint trial program with two other Judges, and I'm going to do nothing else during that three weeks but devote myself to the trial of this mix of cases.

So February is essentially out for this case.

I was hoping that we could get pretty far along in January...

MR. TONE: We'll make every effort, your Honor, to try to accommodate to that schedule.

February 6th. So that's the weeks of February 6, 13 and 20 that your Honor --

THE COURT: Right.

MR. TONE: -- would be tied up.

THE COURT: And then I'd come back to this. That's my plan, to come back to this after that three-week period is over.

MR. GOLDENBERG: But we will be having trial the early days of February.

THE COURT: Right. Right up until the 6th.

MR. TONE: All right. I would -- I guess I would like to -- there's no point in going on to what happens when we come back, because I hope we can finish by February 6th. And I would suggest that everybody make a serious effort to do that. That gives us a target.

THE COURT: When you say finished, you mean finish what?

MR. TONE: Finish the trial.

THE COURT: The whole trial. Well, that would be wonderful if we could, but we have to leave some time for the defense.

(General laughter.)

MR. TONE: That's right. Obviously we'd have to finish before the end of January to make that possible.

MR. GOLDENBERG: It's a practice recently adopted in the Northern District.

(Gneeral laughter.)

MR. TONE: All right. Maybe it's optimistic --

THE COURT: That reminds me of a -- this is off the record.

(Discussion off the record.)

THE COURT: Well, we'll just do the best we can.

I haven't sensed any unnecessary testimony so far. I do think that perhaps at the conclusion of Dr. Schoeffler's testimony I would have heard enough about the technology of the game.

I mean, is that your plan--

MR. TONE: That is the plan.

THE COURT: -- to go on to something else at that point?

MR. TONE: It is. And that's why we put Dr. Schoeffler -- we decided it was best to bring him on at this stage, and that we could thereby avoid some duplication.

Perhaps it's too early to talk about this now, because I do hope we can finish the trial by February 6th.

THE COURT: Maybe what we'll do is try to extend the work day a little when we get back.

I won't be emergency Judge in February, and won't have as many interruptions as we've had.

MR. TONE: I have a special problem that I was debating whether to mention at this time. But I am just starting as a regent of the American College of Trial Lawyers, and their meeting starts -- I had planned to go, to leave for the meeting on the 24th of February and be back approximately the 10th of April -- I mean the 10th of March.

And as your Honor knows, that's kind of an important thing to me. And if we were -- if we did not finish by the 6th, I raise the question of, since we are going to be off three weeks, whether we could be off an additional period to let me take care of that.

THE COURT: Well, I tend to look favorably on that. I won't give you an absolute commitment now; maybe there are other considerations that have to be taken into account as well, but --

MR. TONE: I understand.

THE COURT: But generally that kind of professional activity I think ought to be accommodated.

MR. LYNCH: I didn't have that problem, but I think I'm scheduled for a trial in the middle of March, Judge.

I didn't think this was going to be a problem.

THE COURT: We'll, I've known all along about this February thing --

MR. LYNCH: Oh, I understand.

THE COURT: -- I had committed to that before I even set this case, I think.

Okay, then. I'll see you, what? On the --

MR. LYNCH: Tuesday the 24th.

THE COURT: Tuesday the 24th.

The thing that I have set aside two days for on Friday the 20th and Monday the 23rd conceivably might not

take all that much time.

I won't know that until probably the end of the day on Friday, or at least mid-day on Friday.

If it turns out that I could do something in this case on Monday, we'll give you a call and see what your situation is. I mean, if you can't do it, you can't do it. But if you can, and it doesn't involve any inefficiencies, we might try to get in that day.

MR. TONE: Good. We'd like to have that additional day, if we could do it, and it would -- even for out-of-town counsel it would just mean coming a day earlier. So it wouldn't mean an additional trip.

THE COURT: All right. Well, we'll try to do that.

MR. GOLDENBERG: There's one final matter, Judge, and that is the question of this electronic --

THE COURT: You can leave it all here --

MR. GOLDENBERG: -- electronic Flicker game.

THE COURT: -- you can leave it all here. There's no reason you can't. And you can leave your charts in the jury room.

So far as all your books and everything, I'm going to have no jury trial between now and the next time I see you.

MR. GOLDENBERG: During the recess we would like to arrange with the defendants to copy the contents of the

memory elements in that game, the PROMS or ROMS, as they've been referred to.

And there is a non-destructive way of doing that, which I'm sure the plaintiff is familiar with.

And I take it that we'd be able to work that out.

MR. SCHNAYER: The problem is, your Honor, this is an old -- this is nine or ten years old. That it's working is a miracle.

And if we would start pulling parts out and taking it apart, I'm concerned, especially those kinds of chips that we might destroy.

I mean, we can say that maybe there won't be a problem. But this could lead to destruction of it. And I just think to do that at this point would be -- would create problems, that we'd just lose our exhibit.

MR. GOLDENBERG: I wouldn't ask you to deal with that now, but if we can satisfy the plaintiffs with respect to this, that there would be no damage, I take it that would be appropriate.

THE COURT: They don't have extra ROMs or PROMs lying around, I take it.

MR. SCHNAYER: Unfortunately, this was the machine, and there are no copies of it. That particular program was embedded in that chip, or burned in the chip.

THE COURT: Each machine has a chip?

MR. SCHNAYER: Yes, but this is the only machine that was made back then, and we don't have any -- this is --

THE COURT: Oh, I see.

MR. SCHNAYER: This is the original, this one.

THE COURT: This one is not the same as the ones

that might be in use at the present time.

MR. SCHNAYER: No, no.

MR. KATZ: That's not what he wants. He wants the original one.

MR. SCHNAYER: This was the original machine that was made by Jeffery Frederiksen and David Nutting --

THE COURT: I understand.

MR. SCHNAYER: And this was the only machine they made at that particular time. So there's only a single machine.

THE COURT: Oh. I get the point.

MR. GOLDENBERG: And our question is, we want to verify that the computer program loaded into that machine is the computer program that's been testified in the course of these proceedings.

THE COURT: Well, I think you're entitled to know that.

And just by way of an indication of how I think on it, I think I'd have to be persuaded that there's a real danger of destruction before I would interfere with that.

MR. SCHNAYER: We have of course let them look in the back and pull the boards out and look at them and take notes and things like that.

We'll talk. We'll talk and see if --

MR. GOLDENBERG: Thank you, Judge.

THE COURT: All right.

(A brief interruption.)

THE COURT: Gentlemen, I'd better ask you to reconvene here.

There's a problem on the 24th. I've got a preliminary injunction matter that was set for that day.

They tell me it will take all day. Let's gamble and assume that it won't and start here at 2:00 o'clock. I'll try to get that done in the morning.

But it's one that I can't change because it involves a First Amendment question, and the defendant has agreed not to publish something until further order of court. And I can't enter the order until I've had the hearing.

So I really must give them a hearing. And the 24th is when we set that, so I'll see you at 2:00 o'clock on the 24th, if not on the 23rd.

MR. GOLDENBERG: Thank you, Judge.

MR. TONE: Very well, your Honor.

(Whereupon, the within trial was adjourned at 12:30 o'clock p.m. until Tuesday, January 24, 1984, at 2:00 o'clock p.m.)